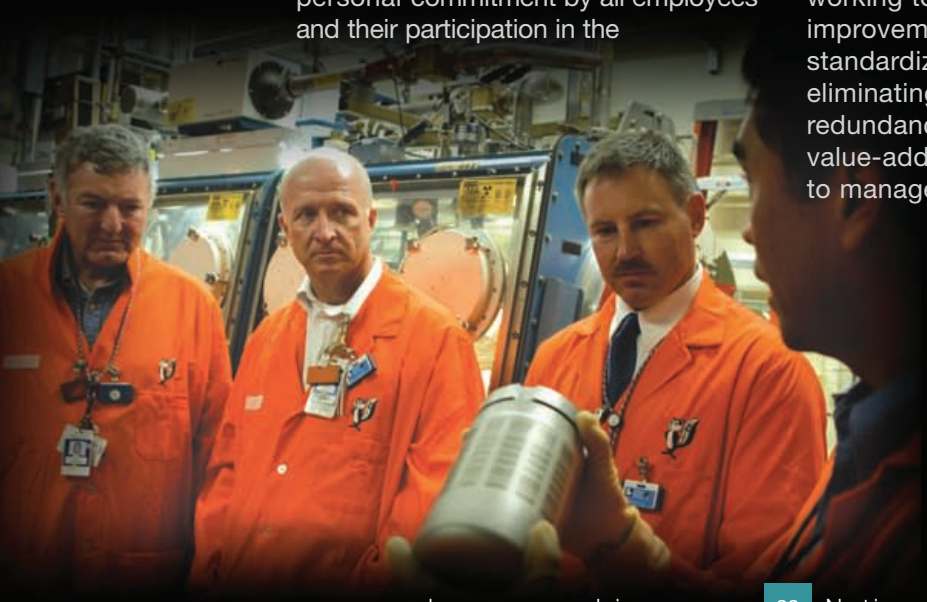
Teamwork to Improve Work Practices

LLNS assumed management of the Laboratory with the aim of strengthening the collective commitment to safety, security, and environmental stewardship and improving operational efficiency and effectiveness. Livermore's operations and business functions had in place many best-in-class practices. Yet, in many operations and business areas, we can do better.

We are building on our successful work practices by making certain that they are followed consistently across the Laboratory. Taking work safety as an example, the National Ignition Facility project has excellent safety programs and an outstanding record of safety performance. Best practices in this project and other successful endeavors are being standardized institutionally and lessons learned will be widely shared with the aid of safety specialists who are integrated into programmatic activities across the Laboratory. Safety is a team effort, depending on a personal commitment by all employees and their participation in the development and implementation of prudent work control processes.

We are also bringing new tools into the workplace—in some cases from LLNS parent organizations—to help us do our job better. We are evaluating the Earned Value Management System (EVMS) for application across the Laboratory on a graded basis, with the first deployment to support operations and business functions. Selected areas of the Laboratory are already using EVMS for project management to meet technical requirements, cost, and schedule. We are implementing Six Sigma methods to support continuous improvement initiatives, and the Laboratory's Business Systems Improvement Project aims to integrate financial, procurement, and human resource systems for better project management.

The key to higher quality and more cost-efficient operations is teamwork—a hallmark of this Laboratory. We are working together for continuous improvement with a focus on standardizing work processes, eliminating duplication and redundancies, and implementing value-adding tools and systems to manage work.



Frank Russo
Principal Associate Director
Operations and Business

Safety is Paramount

Livermore's Integrated Safety Management (ISM) system provides a framework for continually improving safety procedures and practices. A focus on safety by each individual, sound implementation of ISM, and a commitment at all levels of management are critical to success. The Laboratory director's A List features "Strengthen our collective commitment to safety, security, and environmental stewardship" as the first item, and the director stresses this theme in all of his Laboratory-wide talks to employees.

Illness and injury rates are stable after a dramatic decline since the early 2000s. For FY 2007, the rate for recordable cases (number of cases per 100 employee-years) was 2.59, while the rate for cases with days away, restrictions, or job transfers was 1.00. The Laboratory as a whole can do better and has since the beginning of FY 2008 in October. The new management team has set "The Goal is Zero" for accidents and reinvigorated senior management leadership in safety. In addition, Laboratory management is revitalizing grass-roots safety committees and seeking employee involvement in improving health and safety programs.

One particular focus is to strengthen implementation of more uniform, high-quality safety practices across the Laboratory. The Office of Independent Oversight of the DOE Office of Health, Safety, and Security identified this issue during an inspection of the Laboratory in January 2007. The inspection also revealed a number of positive safety activities, including effective processes for annual assessments of ISM implementation, work control in the Plutonium Facility, waste management and cleanup in the Contained Firing Facility, and pollution prevention/waste minimization.

In May, NNSA's Livermore Site Office approved the Laboratory's Worker Safety and Health Program plan. Required for all DOE sites by federal regulations (10 CFR

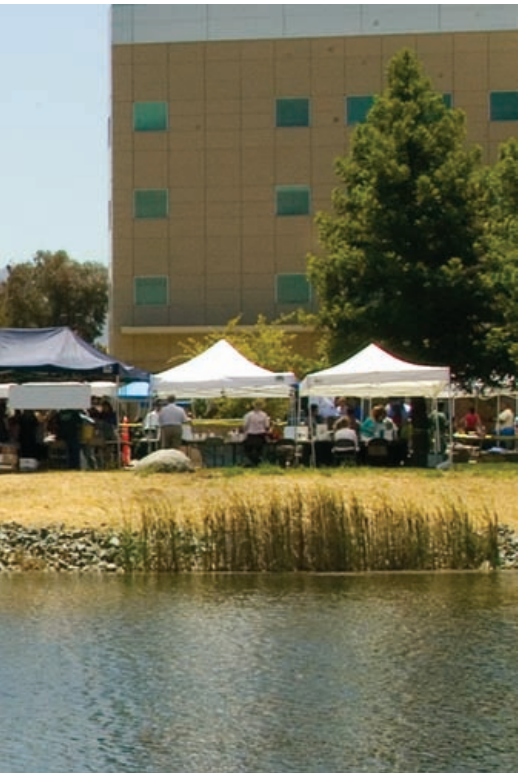
The Laboratory's annual environment, safety, and health fair in June drew hundreds of attendees. The 2007 theme was "Live Safely–Work Safely."

851), the document describes Livermore's plan to protect against workplace hazards and reduce or prevent injuries, illnesses, and accidental losses. The well-being of all employees is also the focus of the Laboratory's Healthy Heart Program. To date, more than 2,000 individuals have participated in risk assessments, offered at no cost to employees. The goals of the Healthy Heart Program are to reduce the risks of cardiovascular diseases and diabetes through comprehensive screenings, education, and programs that create a healthier work environment.

Visitors to the Superblock from the Defense Nuclear Facilities Safety Board and NNSA discuss with a Laboratory expert the packaging of materials to be shipped off site.

Consolidating Nuclear Materials

The Laboratory's Plutonium Facility (Building 332, also known as the Superblock) provides vital support to NNSA's Stockpile Stewardship Program. Research and development activities at the facility include nonnuclear testing of weapons components for surveillance programs, physics and engineering experiments on plutonium, and investigation of technologies for remanufacturing plutonium parts in nuclear components. In the future, Laboratory scientists and engineers will be using facilities elsewhere to conduct much of this work. NNSA's plans for transforming the nuclear weapons complex include the consolidation of weapons-grade plutonium and enriched uranium to fewer sites, including the removal of Security Category I/II quantities of special nuclear materials from Livermore. Only Security Category III amounts of nuclear materials will remain for small-scale experiments.



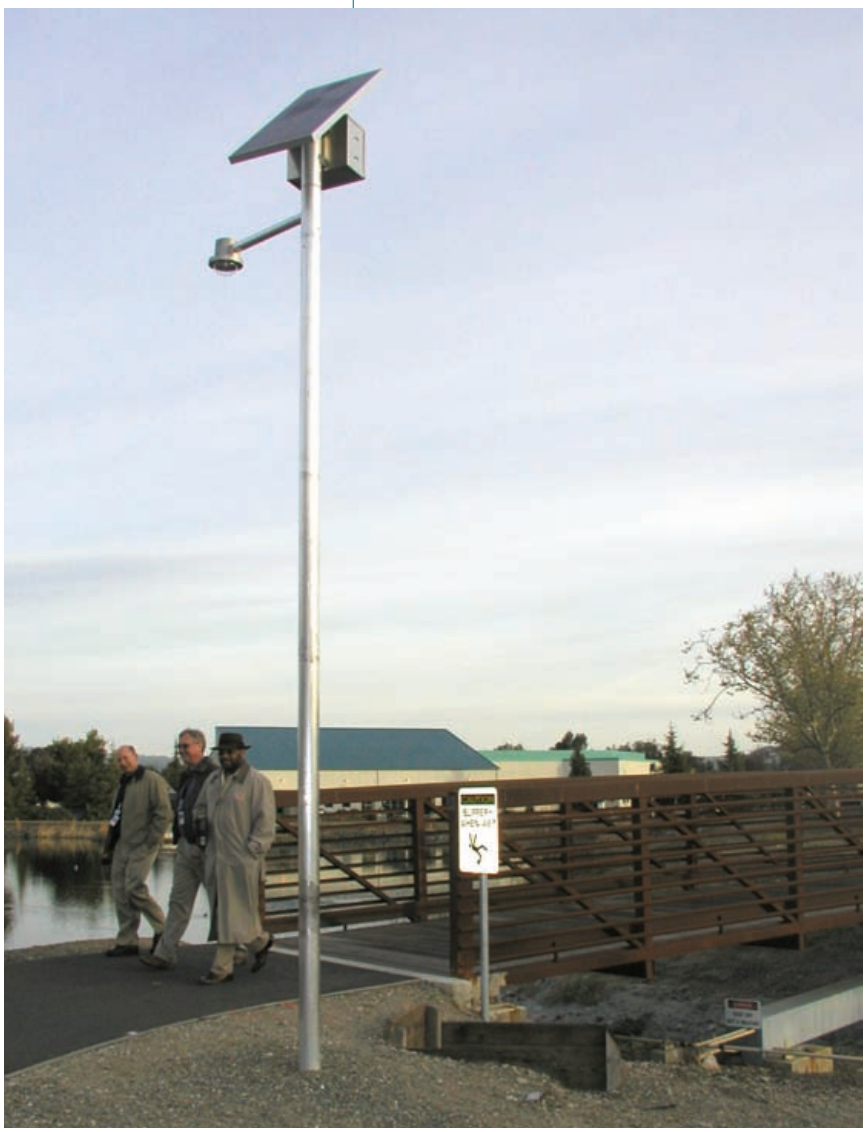
The removal of weapons-grade nuclear materials from Livermore is to be completed by 2012—two years earlier than planned when the first shipment of plutonium left the Laboratory for Los Alamos National Laboratory in late 2006. In 2007, additional material was characterized, processed, packaged to meet rigorous shipping requirements, and moved from Livermore to the Savannah River Site in South Carolina, where surplus nuclear materials are being consolidated. The shipment fully complied with safety and environmental laws and procedures. The move required extensive planning and coordination with DOE headquarters and Savannah River personnel. To develop the overall plan to remove materials from the Superblock by 2012, Laboratory experts had to consider isotopic content, mass, form, and other factors because they affect packaging, shipment, and disposition at the receiving sites.

Efforts continue to increase efficiency, lower costs, and increase safety in Superblock operations as programmatic work continues. Effective and well-defined work control processes are in place, and the Laboratory has made significant improvements in surveillance testing, maintenance, and the process for handling unreviewed safety questions. Implementation of Building 332 Documented Safety Analyses and Technical Safety Requirements is on schedule. Other important improvement initiatives are under way as well, including activities in response to DOE's 2007 independent oversight inspection and a LLNS AIM (assess, improve, and modernize) team review of Nuclear Operations in November 2007.

Responsible Environmental Management

Results reported in the *Lawrence Livermore National Laboratory Environmental Report 2006*, exemplify the Laboratory's commitment to environmental cleanup and environmentally responsible management of its activities. The report found no adverse impact to public health or the environment. The assessment was based on samples taken from air, water, vegetation, soil, and wastewater on site and in surrounding communities as well as wine from vineyards near the Laboratory. In addition, the report documents the substantial actions the Laboratory takes to comply with federal, state, and local environmental laws, including the Clean Air Act, Resource Conservation and Recovery Act, and National Environmental Policy Act, among others. For FY 2007, environmental restoration projects for the Livermore Site and Site 300 continued to meet their milestones.

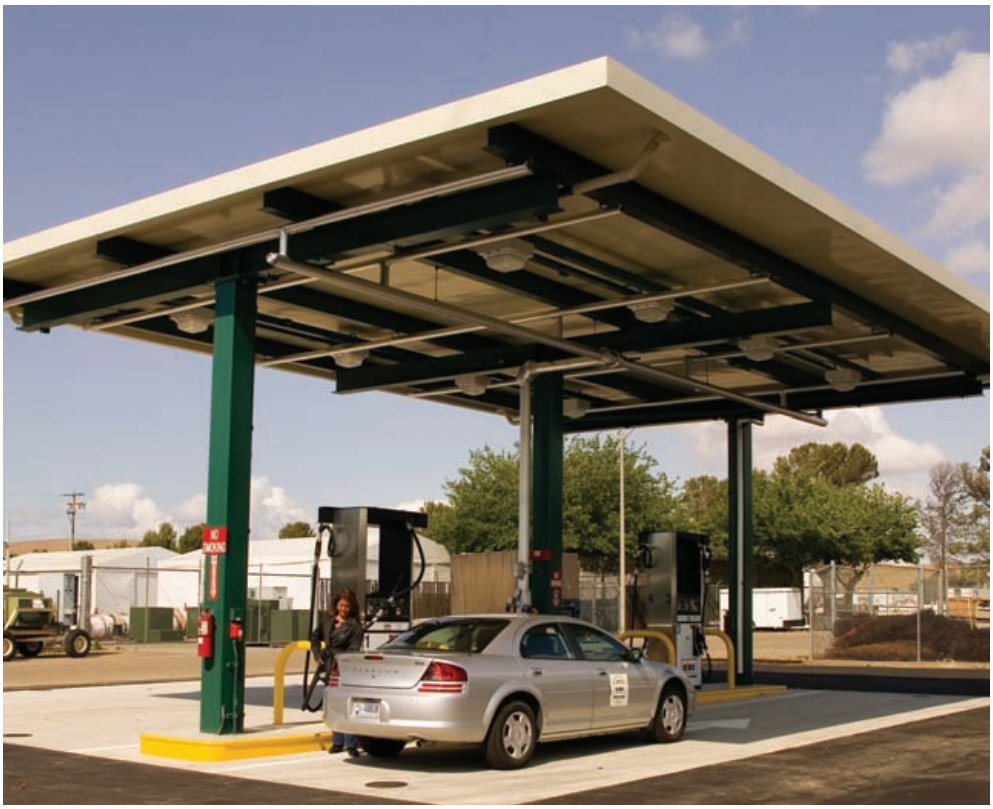
The Laboratory installed photovoltaic lighting along some well-traveled pathways. Each of the solar lighting units is independent, and none are connected to the power grid. Installation is less costly than conventional lighting.



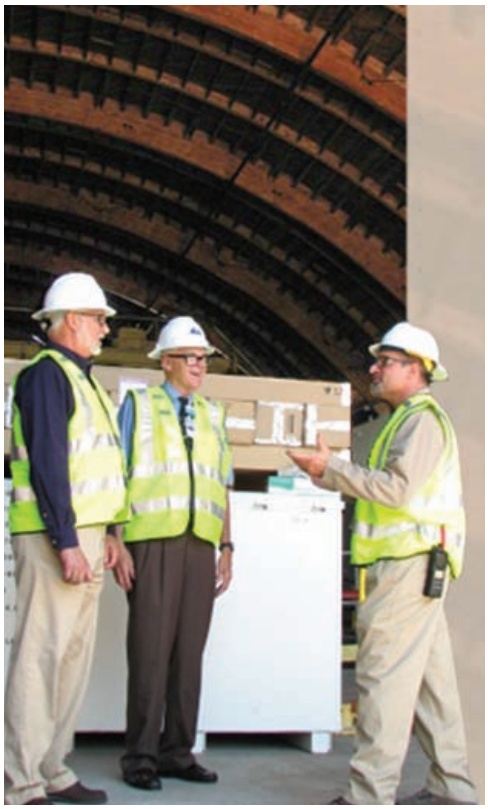
In implementing its ISO 14001 Environmental Management System (EMS), the Laboratory established directorate-specific targets and objectives for significant activities, products, or services that influence the environment and are within the organization's control or influence. EMS, which is part of Livermore's ISM system, promotes responsible environmental stewardship practices with continuous improvement through pollution prevention and conservation measures.

Aggressive programs at Livermore in pollution prevention, waste minimization, and recycling have led to numerous awards from DOE and external regulatory agencies. The Laboratory earned the Environmental Protection Agency Region 9 Champions of Green Government Award for an innovative strategy using contractual mechanisms to eliminate waste streams and increase reuse of materials. NNSA presented the Pollution Prevention Program Best-In-Class Award to the Laboratory's Space Action Team. In the demolition of old structures, the team reduced costs by finding and removing lead paint and other hazardous materials to allow more metal items to be recycled and minimizing the amount of hazardous waste. The waste minimization practices at Site 300's Contained Firing Facility garnered an NNSA Pollution Prevention Environmental Stewardship Award. In addition, the Laboratory received from the White House an honorable mention Closing the Circle Award.

With the opening of the new E85 fuel station on site in May 2007, the Laboratory



The new E85 ethanol–gasoline fueling station helps the Laboratory comply with presidential executive orders to "green the government" and reduce consumption of petroleum products.



Former Laboratory scientific leaders, Jay Davis and Hans Mark, discuss the historic significance of Building 212, which housed a 90-inch cyclotron, with the project manager responsible for the building's demolition.

became a test site for the use of ethanol in vehicles. With 281 alternative-fuel vehicles, the Laboratory has the largest fleet of E85-fueled vehicles in California and the largest of any DOE national laboratory. E85 is a blend of 85 percent ethanol and 15 percent gasoline. Using ethanol reduces the use of petroleum and the amount of pollutants emitted into the atmosphere.

Effective Facilities Management

Unique, state-of-the-art experimental and computational facilities are a core strength of the Laboratory. The Terascale Simulation Facility and the nearly completed National Ignition Facility are flagship facilities and cornerstones of NNSA's Stockpile Stewardship Program. In 2007, the $26.6 million Engineering Technology Complex Upgrade was completed to modernize a facility that provides a precision fabrication capability essential for stockpile stewardship and other programs at Livermore.

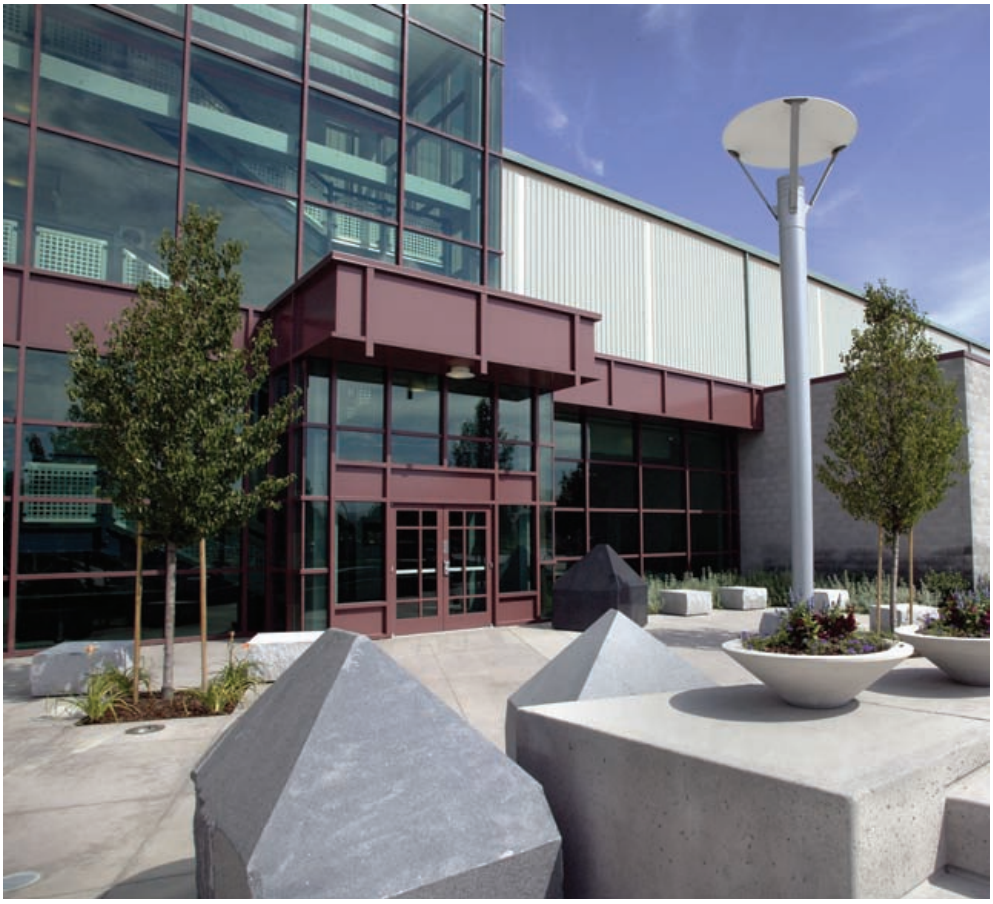
As the transformation of the nuclear weapons complex proceeds, the list of older buildings and legacy facilities is growing. In addition, the Laboratory's information-technology infrastructure is in need of modernization. Livermore's facility and infrastructure investment strategy, formulated in full partnership with NNSA, balances efforts to rehabilitate older facilities, consolidate activities as mission priorities change, maintain aging mission-critical facilities, and efficiently manage legacy facilities. Through effective facility management practices, including an aggressive reinvestment program established in 1998, the Laboratory has stabilized its backlog of deferred maintenance at a level that met NNSA's corporate goals several years ahead of schedule.

Livermore is widely recognized as having a highly cost-effective program for decontaminating and demolishing buildings, with a best-in-class safety and environmental record. From 2002, when NNSA began funding such projects through this coming year, the Laboratory will have demolished approximately 400,000 gross-square-feet (gsf) of legacy space. Among the larger projects, decontamination and demolition of Building 431—a 53-year-old, technically obsolete, five-story structure—was completed in 2007, and demolition is under way on the 64-year-old Building 212, for a total of about 150,000 gsf. Livermore expects to contribute an additional 470,000 gsf toward the complex-wide goal of demolishing 5 million gsf of legacy space by 2017.

Upgrading Business Systems and Practices

Activities to upgrade information and financial systems, adopt best practices in all areas of business services and operations, and continuously improve work processes aim to increase the cost efficiency of Laboratory work as well as sponsor satisfaction with the quality of work products. Multiyear initiatives to improve work tools and practices are under way, and they are enhanced by the expertise and proven systems that the new management team and LLNS parent organizations bring to the Laboratory.

Large projects at the Laboratory, such as the National Ignition Facility and recently completed Engineering Technology Complex Upgrade, and a growing list of smaller efforts have benefited from the use of EVMS. Considered to be a best-practices tool, EVMS provides an effective means for evaluating how well a project is being executed with respect to technical requirements, cost, and schedule. EVMS offers a clear view of status and progress to sponsors, Laboratory managers, and those engaged in the project. Implementing EVMS across the Laboratory is being done on a graded basis, first in selected directorates as a pilot project. Effective use of EVMS depends on the accurate development of a project's Work Breakdown Structure (WBS)—the work elements of a project and their relationships with each other and the final product. WBS tools, training, and integration into the financial management systems are critical for optimal project management.



The National Ignition Facility has successfully used the Earned Value Management System to track construction and commissioning activities and keep them on schedule.

The multiyear Enterprise Project Accounting and Reporting Program, now called the Business Systems Improvement Project (BSIP), completed the second of four development and release phases in 2007. BSIP aims to integrate Livermore's financial, procurement, and human resources systems. Improvements to date pave the way for the ongoing third phase, which is to convert all institutional business systems from a cost account basis to a project and task basis, allowing effective use of WBS and EVMS. In the human resources area, the Laboratory's system for managing employee information, the Livermore Administrative People Information System (LAPIS), continues to be upgraded with new online, self-service features. LAPIS was able to handle most personnel actions related to employment and retirement options during the transition from management by UC to LLNS. The Laboratory is completing transfer of the day-to-day operation of these institutional computer systems to a new secure, highly reliable data center that was built and opened for service in 2007.

The Contractor Assurance System Continuous Improvement Office is providing resources to assist organizations in performance improvement. Three process analysts work alongside teams within organizations to help improve existing processes and design new practices to meet customer needs. In 2007, these analysts undertook Bechtel's Black Belt training in Six Sigma, a data-driven methodology for increasing the quality and efficiency of work activities. More than 60 process improvement projects are completed or well under way, spanning every directorate at the Laboratory. Many projects are focused on achieving greater cost efficiencies.